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PATENT

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Date:

1-18-05


Himanshu S. Amin

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Applicant: Khoi Phan, *et al.*

Examiner: Erick J. Rekstad

Serial No: 09/553,841

Art Unit: 2163

Filing Date: April 21, 2000

Title: SYSTEM AND METHOD FOR VISUALLY MONITORING A
SEMICONDUCTOR PROCESSING SYSTEM

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPEAL BRIEF

Dear Sir:

Applicant's representative submits this brief in connection with an appeal of the above-identified patent application. A credit card payment form is filed concurrently herewith in connection with all fees due regarding this appeal brief. In the event any additional fees may be due and/or are not covered by the credit card, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063 [AMDP468US].

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I. Real Party in Interest (37 C.F.R. §41.37(c)(1)(i))

The real party in interest in the present appeal is Advanced Micro Devices, Inc., the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. §41.37(c)(1)(ii))

Appellants, appellant's legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which may be related to, will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §41.37(c)(1)(iii))

Claims 1-23 stand rejected by the Examiner. The rejection of claims 1-23 is appealed.

IV. Status of Amendments (37 C.F.R. §41.37(c)(1)(iv))

No claim amendments have been entered subsequent the Final Office Action.

V. Summary of Claimed Subject Matter (37 C.F.R. §41.37(c)(1)(v))**A. Independent Claim 1**

Independent claim 1 recites a system that visually monitors semiconductor processing, the system comprises a develop chamber and an image collector located at least partially within the develop chamber, the image collector collects energy reflected from inside the develop chamber and transmits a signal indicative of interior of the chamber. (See p.2, ll.6-15, p.3, ll.24-26, p.4, ll.24-25 and pp.8-9, ll.30-1).

B. Independent Claim 15

Independent claim 15 recites a system that visually monitors an internal part of a semiconductor processing system, the system comprises imaging means for collecting images of an interior of an enclosed developer and providing an image signal indicative

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of a visual representation of the interior of the developer and viewing means for receiving the image signal and providing a visual representation of the interior of the chamber.

(See p.2, ll.16-21, p.3, ll.24-26, p.4, ll.24-25 and pp.8-9, ll.30-1).

C. Independent Claim 19

Independent claim 19 a method for visually monitoring an interior of an enclosed developing chamber in a semiconductor processing system, the system comprises collecting visual images of the interior of the chamber and providing an image signal indicative thereof and displaying a visual representation of the interior of the enclosed chamber based on the image signal. (See p.2, ll.22-25, p.3, ll.24-26, and p.4, ll.24-25).

VI. Grounds of Rejection to be Reviewed (37 C.F.R. §41.37(c)(1)(vi))

A. Claims 1, 2, 4, 6, and 13 stand rejected under 35 U.S.C. §102(b) as being anticipated by Batchelder, *et al.* (U.S. 4,647,172).

B. Claims 1-3, 5-7, 10-12, and 15-23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Sanada (U.S. 5,843,527) in view of Ogata (U.S. 6,313,903).

VII. Argument (37 C.F.R. §41.37(c)(1)(vii))

A. Rejection of Claims 1, 2, 4, 6, and 13 Under 35 U.S.C. §102(b)

Claims 1, 2, 4, 6, and 13 stand rejected under 35 U.S.C. §102(b) as being anticipated by Batchelder, *et al.* (U.S. 4,647,172). It is respectfully requested that this rejection be withdrawn for at least the following reasons. Batchelder, *et al.* does not teach or suggest each and every element as set forth in the claimed invention.

A single prior art reference anticipates a patent claim only if it expressly or inherently describes each and every limitation set forth in the patent claim. *Trintec Industries, Inc., v. Top-U.S.A. Corp.*, 295 F.3d 1292, 63 U.S.P.Q.2D 1597 (Fed. Cir. 2002). "A claim is anticipated only if each

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and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Independent claim 1 recites a *develop chamber with an image collector, located at least partially therein*, that collects energy reflected from inside the develop chamber. The Examiner asserts that Batchelder, *et al.* teaches a chamber with an image collector located at least partially therein, as recited in the subject claim. However, Batchelder, *et al.* does not teach or suggest such claimed aspects. In particular, the Examiner states that the photodetector taught in Batchelder, *et al.* is “contained” in an apparatus since claim 1 is an apparatus claim. However, Batchelder, *et al.* utilizes the term “apparatus” in claim 1 simply to signify the type of claim as a structural entity, for instance, as opposed to a method claim, which includes one or more acts. In claim 1, Batchelder, *et al.* does not contemplate the location of a photodetector with respect to a develop chamber. At most, Batchelder, *et al.* discloses in the specification techniques for observing or monitoring the development of wafer resists *through a window* (not by image collectors residing at least partially within a develop chamber) of a batch development tank. (See col. 1, ll. 9-16).

The Examiner further asserts that Batchelder, *et al.* teaches a photodetector that collects *reflected* light as recited in the subject claim. However, Batchelder, *et al.* explicitly teaches the photodetector senses *scattered* light. (See col. 1, l. 37; claims 1, 2 and 3). As known by one of ordinary skill in the art at the time of the invention, scattered light is not synonymous with reflected energy. Scattered light refers to energy thrown in random directions, whereas reflected energy, as recited in the subject claims, is directed (not randomly thrown) such that it is received by an image collector that is positioned at least partially within the develop chamber.

B. Rejection of Claims 1-3, 5-7, 10-12, and 15-23 Under 35 U.S.C. §103(a)

Claims 1-3, 5-7, 10-12, and 15-23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Sanada (U.S. 5,843,527) in view of Ogata (U.S. 6,313,903). It is

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respectfully requested that this rejection be withdrawn for at least the following reasons. There is no suggestion or motivation in either reference to modify Sanada in view of Ogata or to combine the references to teach Applicants' invention as recited in the subject claims.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Independent claim 1 recites a system comprising a *develop chamber* with an *image collector* located at least partially therein, wherein the image collector collects energy reflected from inside the develop chamber and transmits a signal indicative of interior of the chamber. The Examiner concedes that Sanada does not teach or suggest a develop chamber, but asserts that Ogata teaches a unit that is both a coater and a developer and that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the references to teach the subject claims. However, Ogata is silent regarding monitoring a develop process or collecting reflected energy within a develop chamber. It is respectfully submitted that simply because the coater and developer of Ogata are one unit does not mean it would be obvious to combine the teachings of Sanada and Ogata to result in a develop chamber with an image collector that collects energy reflected therein and transmits a signal indicative of interior of the chamber as recite in the subject claims. The mere fact that references can be modified does not render the modification obvious unless the cited references also suggest the desirability of the modification. (*In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)). Since Sanada relates to visually monitoring a coating process and Ogata does not contemplate monitoring a develop process, Applicants' representative submits that there

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is no teaching, suggestion, motivation or desirability (it would not have been obvious) to combine these references to teach the subject claims.

Independent claim 15 recites a system comprising *imaging means for collecting images of an interior of an enclosed developer*. Such imaging means, as disclosed in Applicants' specification, includes an *image collector located at least partially within a develop chamber*. The combination of Sanada and Ogata does not teach or suggest such aspects. The Examiner concedes that Sanada does not teach or suggest a develop chamber, and Ogata does not contemplate monitoring a develop process or collecting reflected energy within a develop chamber. (*See In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990) (holding the mere fact that references can be modified does not render the modification obvious unless the cited references also suggest the desirability of the modification)). Since Sanada relates to visually monitoring a coating process and Ogata does not contemplate monitoring a develop process, Applicants' representative submits that there is no teaching, suggestion, motivation or desirability to combine these references to teach the subject claims; and, thus, Sanada in view of Ogata does not make obvious the subject claim.


Independent claim 19 recites a method comprising *collecting visual images* of the interior of a *developer chamber*. Sanada and Ogata, individually and in combination, fail to teach or suggest such aspects. As noted *supra*, Sanada does not teach or suggest a develop chamber, and Ogata does not contemplate collecting visual images of the interior of a developer chamber. Since neither reference teach or suggest collecting visual images of the interior of a developer chamber, the combination fails to render the claims obvious pursuant to 35 U.S.C. §103.

09/553,841E0806**C. Conclusion**

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the rejections of claims 1-23 be reversed.

If any additional fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

Respectfully submitted,
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VIII. Claims Appendix (37 C.F.R. §41.37(c)(1)(viii))

1. A system that visually monitors semiconductor processing, comprising:
a develop chamber; and
an image collector located at least partially within the develop chamber, the image collector collects energy reflected from inside the develop chamber and transmits a signal indicative of interior of the chamber.
2. The system of claim 1 further includes a light source that illuminates the interior of the develop chamber to enable the image collector to obtain a visible image of the interior of the chamber.
3. The system of claim 2, the light source is a light emitting diode.
4. The system of claim 2, the light source is a fiber optic cable with a light emitting portion located within the develop chamber.
5. The system of claim 2, further comprises a coater chamber that provides photoresist material on a substrate, the light source provides light at a wavelength so as not to expose the photoresist material.
6. The system of claim 2, the develop chamber develops photoresist material on a substrate, the light source provides light at a wavelength so as not to expose the photoresist material.
7. The system of claim 2, the image collector includes a camera module that collects the images and provides an electrical signal indicative of a visual representation of the interior of the chamber.

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8. The system of claim 7, the camera module is connected with one end of a fiber optic cable, a lens being connected with another end of the fiber optic cable for collecting the images from the interior of the chamber and providing the image signal to the camera module, the camera module converting the image signal into the electrical signal.
9. The system of claim 8, the lens is faceted to receive reflected light from a plurality of discrete directions within the chamber so that the image signal is formed of an image from each of the discrete directions.
10. The system of claim 7 further includes a viewing station that receives the electrical signal and displays a visual representation of the interior of the chamber according to the electrical signal.
11. The system of claim 10, the viewing station includes a controller that selectively controls activation of the camera module.
12. The system of claim 11, the controller further controls the light source.
13. The system of claim 1, the image collector includes a fiber optic cable having a light receiving end disposed within the chamber for collecting images of the interior of the chamber, another end of the fiber optic cable being connected to a camera module that provides the image signal indicative of the interior of the chamber, the camera module converting the image signal into an electrical signal indicative of the interior of the chamber.
14. The system of claim 13, the light receiving end of the fiber optic camera includes a lens for receiving light from a plurality of discrete directions within the chamber so that the image signal is formed of an image from each of the discrete directions.

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15. A system that visually monitors an internal part of a semiconductor processing system, comprising:

imaging means for collecting images of an interior of an enclosed developer and providing an image signal indicative of a visual representation of the interior of the developer; and

viewing means for receiving the image signal and providing a visual representation of the interior of the chamber.

16. The system of claim 15, the imaging means includes a camera having a lens portion located within the chamber to collect the images and provide the image signal.

17. The system of claim 15 further includes illumination means for illuminating the interior of the chamber to facilitate collecting images of the interior of the chamber by the camera.

18. The system of claim 17 further includes means for selectively controlling at least one of the camera and the illumination means.

19. A method for visually monitoring an interior of an enclosed developing chamber in a semiconductor processing system, comprising the steps of:

collecting visual images of the interior of the chamber and providing an image signal indicative thereof; and

displaying a visual representation of the interior of the enclosed chamber based on the image signal.

20. The method of claim 19 further includes the step of illuminating the interior of the enclosed chamber to facilitate collecting of visual images.

21. The method of claim 20, the step of illuminating includes emitting light within the chamber at a wavelength which does not interfere with processing within the chamber.

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22. The method of claim 19 further includes the step of controlling the steps of emitting and collecting so that the visual representation includes images of processing within the chamber.
23. The method of claim 19, visual representation is displayed remotely from the semiconductor processing system.